

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 August 2003 (14.08.2003)

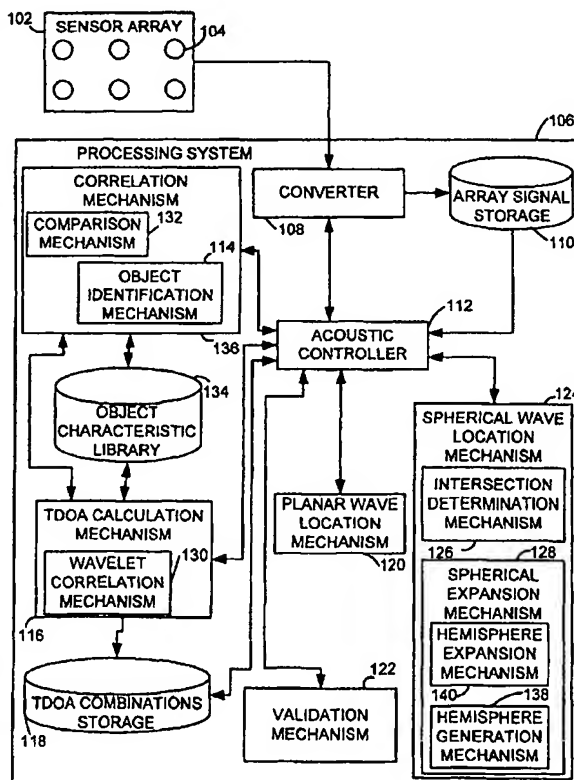
PCT

(10) International Publication Number
WO 03/067281 A1

- (51) International Patent Classification⁷: G01S 5/28, 13/86, 5/18
- (72) Inventor; and
(75) Inventor/Applicant (for US only): MILLIKIN, Rhonda, L. [CA/CA]; 36 Ettrick Crescent, Nepean, Ontario K2J 1G1 (CA).
- (21) International Application Number: PCT/CA03/00250
- (22) International Filing Date: 24 February 2003 (24.02.2003)
- (74) Agents: FEUTLINSKE, Robert, K. et al.; Kirby Eades Gale Baker, P.O. Box 3432, Station D, Ottawa, Ontario K1P 6N9 (CA).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/362,590 27 February 2002 (27.02.2002) US
- (71) Applicant (for all designated States except US): HER MAJESTY THE QUEEN IN RIGHT OF CANADA as represented by THE MINISTER OF NATIONAL DEFENCE [CA/CA]; National Defence Headquarters, 101 Colonel By Drive, Ottawa, Ontario K1A 0K2 (CA).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: IDENTIFICATION AND LOCATION OF AN OBJECT VIA PASSIVE ACOUSTIC DETECTION



(57) **Abstract:** An object producing an acoustic wave is located and identified by passive detection of the acoustic wave. The acoustic wave is detected by different sensors (104) in an array (102) having a plurality of passive acoustic detectors (104). The sensors (104) produce signals in response to detection of the acoustic wave. A wavelet derived from an acoustic wave of a known form with which each of the at least three signals correlates is determined. Time difference of arrival (TDOA) measurements between the at least three signals using correlation intensity with the wavelet is used to perform acoustic reciprocity from each of the different detectors. The result of the acoustic reciprocity is a hemisphere centered around each of the different sensors (104). The hemispheres produced by the acoustic reciprocity are examined to determine an intersection point of at least three hemispheres. The size of the hemispheres is increased according to the velocity of the acoustic wave and pre-determined intervals until an intersection point is found. The intersection point represents the location of the object.

WO 03/067281 A1